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# Utilization of a SARS-CoV-2–positive donor for liver transplantation

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## ABSTRACT

Liver transplantation rates have been negatively affected by the pandemic caused by coronavirus disease 2019 (COVID-19), the disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Current practice in the liver transplant community is to avoid utilizing SARS-CoV-2–positive donors for liver transplantation unless there is a compelling reason such as recipient illness severity. In this case, we report the use of a donor who had a positive exposure to and symptom history for COVID-19 and tested positive for SARS-CoV-2 on admission for a liver transplant recipient with primary sclerosing cholangitis and a Model of End-Stage Liver Disease score of 23 with no known COVID-19 exposures. We focus on the decision to accept this particular organ, as well as the discussion with the recipient about the unknowns of disease transmission and risk associated with this donor. The current case argues that transplant programs should begin to consider low-risk donors with positive SARS-CoV-2 testing for recipients who have the potential to benefit from liver transplantation, which may not only be those with the most severe illness.

**KEYWORDS** COVID-19; liver allocation; liver transplantation

The coronavirus disease 2019 (COVID-19) pandemic, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has negatively impacted organ transplantation throughout the world.[1] The general consensus of the liver transplant community has been to not utilize solid organs from SARS-CoV-2–positive donors.[2,3] However, it has been argued that mildly symptomatic or asymptomatic SARS-CoV-2–infected donors may offer a favorable risk/benefit calculation for liver transplant recipients with severe disease.[4,5] While the concept of utilizing SARS-CoV-2–positive liver donors for severely ill patients is a starting point, these donors may also be ideal for waitlisted patients with moderate disease who will benefit from transplantation but are unlikely to receive donor offers due to lower Model of End-Stage Liver Disease (MELD) scores. In this report, we describe such a case of liver transplant in a low MELD patient with an asymptomatic COVID-19–positive donor.

## CASE REPORT

A 37-year-old man with primary sclerosing cholangitis, a MELD score of 23, and a B blood type received a liver transplant from a 14-year-old brain-dead donor with normal liver function who had tested positive for SARS-CoV-2 on admission via nasopharyngeal swab (Cephid Infinity, rapid polymerase chain reaction [PCR] test). Per family report, the donor had a household contact with a confirmed positive test for SARS-CoV-2 a month earlier. At that time, the donor had symptoms consistent with SARS-CoV-2 but was never tested. Three days after admission, reverse transcriptase (RT)-PCR COVID-19 testing was repeated with a nasopharyngeal swab, bronchioalveolar lavage, and tracheal aspirate, all three of which were negative. Donor chest x-ray showed no infiltrates, and chest computed tomography showed only a small pneumothorax and pulmonary contusions. The donor offer came to our patient at match sequence 49 and had been declined for a variety of reasons for the prior patients,

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**Table 1. Donor and recipient testing results for IgG and IgM subtypes***

| Subtype | Recipient IgG | Donor IgG | Recipient IgM | Donor IgM |
|---|---|---|---|---|
| Nucleocapsid | + | + | − | − |
| Spike | − | + | − | Borderline |
| RBD | − | + | − | Borderline |
| S1 | − | + | − | − |
| S2 | − | + | − | − |

*Recipient testing was done on postoperative day 7. Donor testing was done on blood drawn on the day of organ procurement but resulted a couple of weeks after donation.

RBD indicates receptor binding domain; S1, spike protein subunit 1; S2, spike protein subunit 2.

including 12 declines for COVID-19–related donor reasons. Given the excellent quality of the donor liver and the fact that our recipient would likely not get offers of similar quality due to his MELD score of 23, we elected to provide our recipient with details of the offer, focusing especially on the unknown risk and consequences of SARS-CoV-2 transmission, and he elected to proceed. The recipient had no known history of COVID-19 exposures or COVID-19 symptoms and tested negative for SARS-CoV-2 by nasopharyngeal swab (RT-PCR) both a week prior and 2 days prior to transplant, and vaccination was not available at that time.

The recipient transplant operative procedure was uncomplicated. Immunosuppression followed standard center protocol of a steroid taper, mycophenolate starting on postoperative day 1, and tacrolimus staring on postoperative day 3. The recipient's postoperative course was complicated by an ileus, a biliary stricture requiring revision, and steroid-resistant rejection. On postoperative day 7, the recipient tested negative for qualitative SARS-CoV-2 IgG antibodies (Architect, Abbott). He also was tested by semiquantitative SARS-CoV-2 IgG and IgM antibodies (LABScreen COVID Plus, Thermo Fisher). The results were positive for the nucleocapsid IgG, which indicates a prior exposure to COVID-19. Given this unexpected finding, we tested the pretransplant donor serum and found IgG antibodies positive for all targets as well as borderline positive S and receptor binding domain IgM *(Table 1)*. At 3 months posttransplant, the recipient has normal liver function.

## DISCUSSION

Several important unknowns from this case need attention. From the recipient perspective, we cannot exclude the possibility of having a prior asymptomatic SARS-CoV-2 infection that resulted in the positive nucleocapsid IgG. From the donor perspective, the first positive SARS-CoV-2 test may have been a false-positive, but it is more likely that it represented ongoing shedding of virus rather than an active infection. Because data regarding the safety of organ donation from donors with previous SARS-CoV-2 or asymptomatic SARS-CoV-2 are limited, the United Network for Organ Sharing recommends a discussion with the transplant candidate or proxy about the risks of transplantation vs the risks of not proceeding with transplantation, which is exactly how we approached this case.[6] Because the donor was asymptomatic, the likelihood of viremia was low, and we used this to inform the discussion with our recipient.[7] As we learn more about the risks of SARS-CoV-2 transmission in solid organ transplantation, develop more nuanced testing algorithms, and understand the impact of donor SARS-CoV-2–positive tests on organ transplant outcomes, the transplant community must consider scenarios in which the benefits of organ transplantation exceed the risks associated with donor SARS-CoV-2 transmission.

In conclusion, this case demonstrates the potential for utilization of donors with positive SARS-CoV-2 test results for liver transplantation for low-MELD patients with appropriate informed consent discussions. Given the increased availability of both testing modalities and vaccines, it is time to start selectively considering SARS-CoV-2–positive donors with low transmission risk for solid organ transplantation and reexpanding the organ donor pool.


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